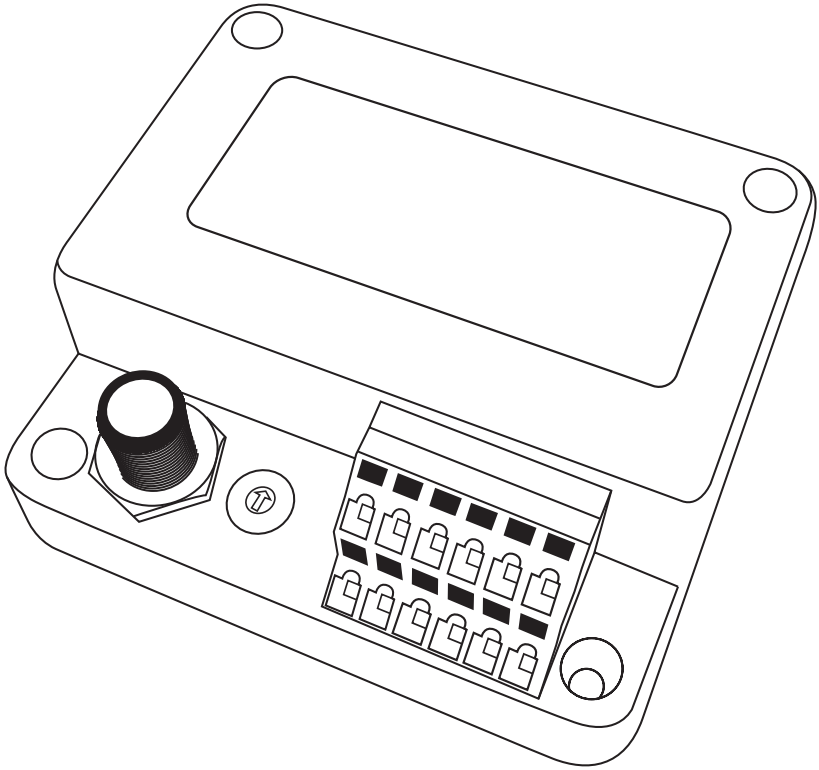
NMEA2000® AC MONITOR
Part Numbers: 3420
USER MANUAL



Revision 1.00

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1 INTRODUCTION

The Offshore System's NMEA2000® 3420 AC Monitor is designed to monitor any AC source including single-phase (phase A), single-phase (phase A,B), and three-phase (phase A,B,C) This unit is designed to operate in a protected marine environment such as an engine room. It is very important that it is installed and set up correctly according to this manual. Please read and follow the installation and setup instructions carefully to achieve the best results.

1.1 FIRMWARE REVISION

The information in this manual corresponds to firmware revision 1.0.0

1.2 PRODUCT FEATURES

The NMEA2000® 3420 AC Monitor has the following features:

- **Inputs from AC voltage (Max 280 VAC), 200 Amp AC Current Transformer**
- **User Settable Device Instance using rotary switches**
- **User Settable Circuit Type**
- **Heartbeat blue LED confirming NMEA transmission.**
- **NMEA2000® micro C interface plug**
- **Panel or DIN rail mounting option**
- **The unit reports AC Voltage, Current, Power, Frequency.**

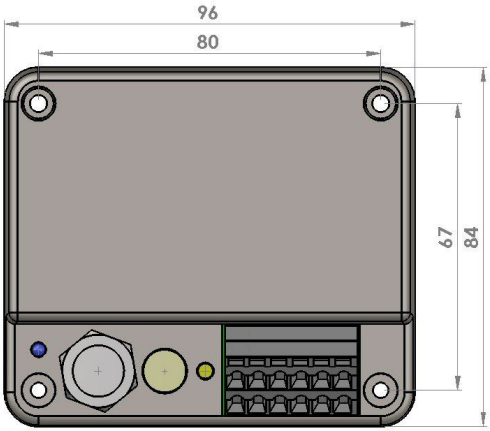
2 INSTALLATION

2.1 UNPACKING THE BOX

You should find the following items in the 3420 shipping box:
1 x 3420 NMEA2000® AC Monitor
1 x 3420 User Manual (This document)
1 x 3420 200 Amp AC Current Transformer

2.2 MOUNTING THE UNIT

The unit should be mounted to a flat surface using 4 mounting screws. The unit dimensions and mounting hole locations are shown on the following drawing.



Note: Mount away from sources of condensation and moisture

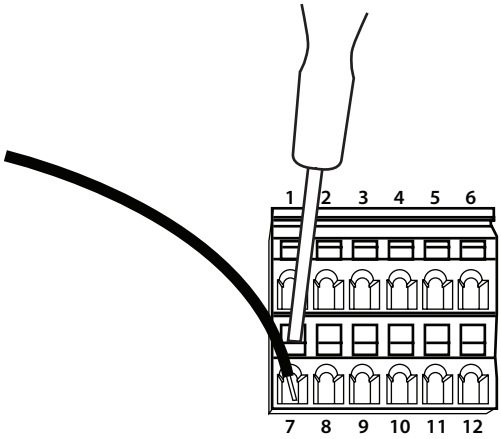
2.3 CONNECTING THE NMEA2000® CABLE

The unit is connected to the NMEA2000® network by the 5 way micro C socket on the front. Carefully attach the network drop cable to this plug and hand tighten until it it is fully seated. Take care to match the orientation of the pip inside the socket to the recess inside the drop cable plug. The other end of the drop cable should be connected to a suitable Tee connector on the NMEA2000® network backbone cable.

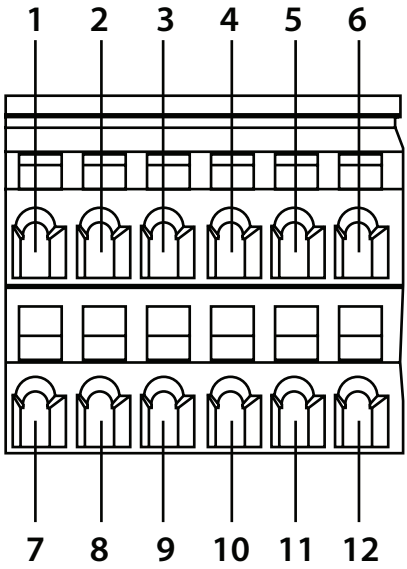
2.4 CONNECTING THE SENSOR CABLES TO THE WAGO SOCKET

WARNING: Risk of Electric Shock
This device contains potentially hazardous voltages. Ensure that power is removed from all AC circuit that will be connected to the AC monitor. Do not attempt to disassemble the device. This device contains no user serviceable parts. Connecting the AC monitor must be performed by QUALIFIED ELECTRONICS ENGINEER ONLY.

The cables from the power-source to the external sockets are connected using the 6 x 2way WAGO Cage Clamp terminal block. The wire should be stripped for 8mm and then the cage clamp opened with a small screwdriver in the slot above the wire connection. Then simply insert the wire into it's connection slot and release the cage clamp by removing the small screw driver. This will produce a secure gas tight connection on wire sizes from 0.08 – 2.5 mm^2



The terminal connections are numbered as follows:



2.5 AC MONITOR CONNECTIONS

Terminal 1	Current Transformer Phase A (2)	
Terminal 2	Current Transformer Phase B (2)	
Terminal 3	Current Transformer Phase C (2)	
Terminal 4	Voltage Phase A Line	(Fit in-line 3 Amp fuse)
Terminal 5	Voltage Phase B Line	(Fit in-line 3 Amp fuse)
Terminal 6	Voltage Phase C Line	(Fit in-line 3 Amp fuse)
Terminal 7	Current Transformer Phase A (1)	
Terminal 8	Current Transformer Phase B (1)	
Terminal 9	Current Transformer Phase C (1)	
Terminal 10	No Connection	
Terminal 11	Neutral	
Terminal 12	No Connection	

WARNING: Incorrect connections may result in damage to the unit and personal injury

3 CONFIGURATION

The following items can be configured on the 3420.

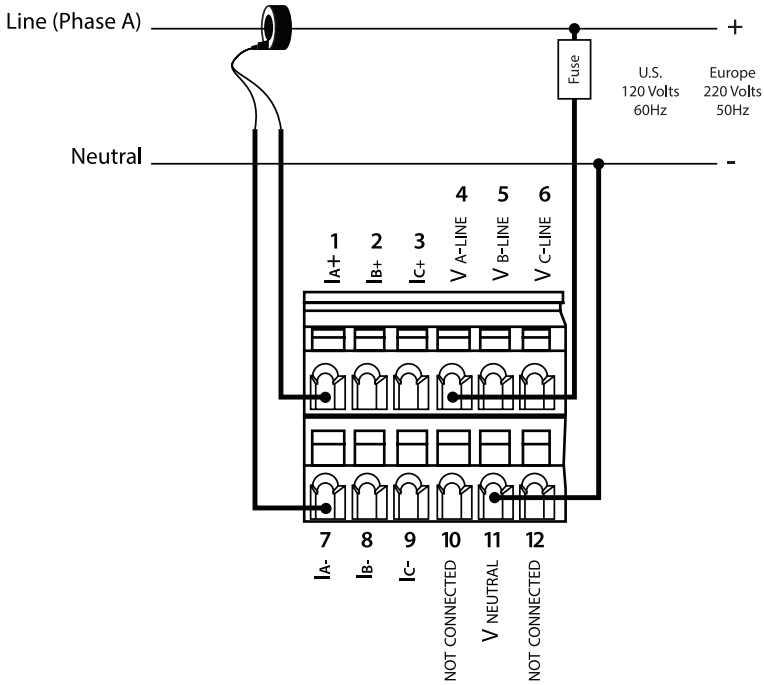
3.1 CONFIGURING CIRCUIT TYPE

Before the AC monitor is ready to use, the type of system you will be monitoring has to be set up. When turning on the AC monitor for the first time the blue LED will flash quickly to indicate it's not set up. The AC Monitor is set up by turning the small rotary switch with a small screw driver to the required setting and then pressing the button for 5 seconds. Be sure to return the switch to the correct instance setting afterwards.

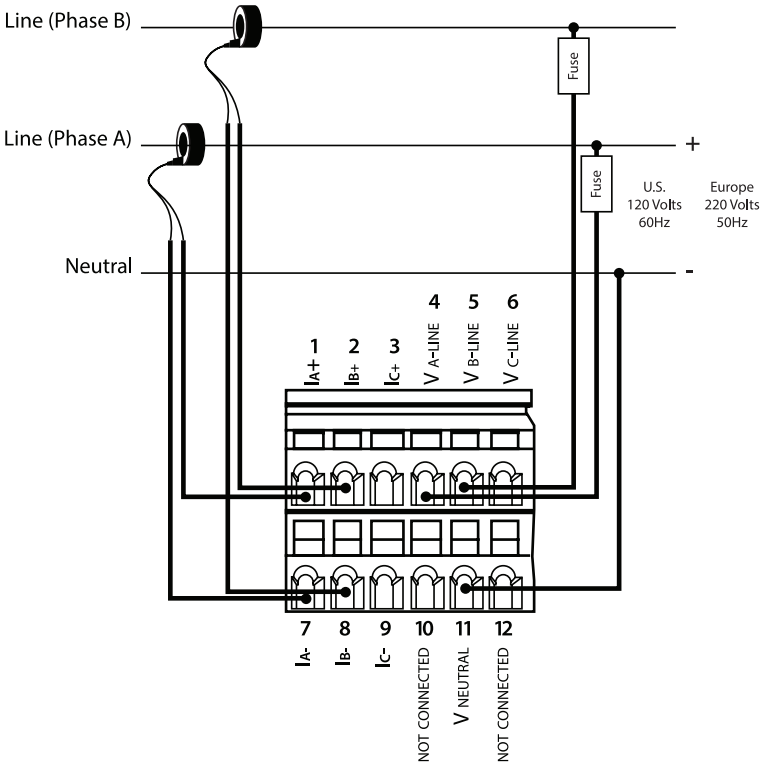
Note. You can always change the set up of the AC monitor by pressing the set up button for 5 seconds. If the LED flashes quickly after the setup, it means the value of the rotary switch is out of range.

Switch position (when button held 5 seconds)	AC Source and Circuit Type
1	Generator Single Phase (Phase A)
2	Generator Single Phase (Phase A, B)
3	Generator Three Phase (Phase A,B,C)

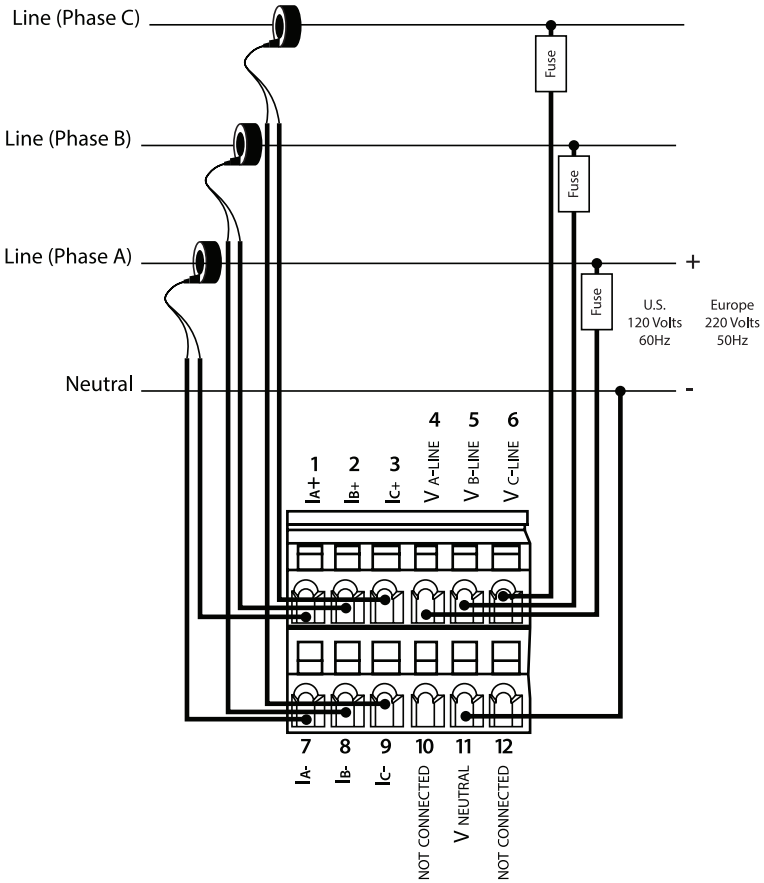
Single Phase Connection



Two Phase Connection



Three Phase Connection



3.2 DEVICE INSTANCE

It is possible to install 16 3420 AC Monitors on a NMEA2000® network so they need to each have a unique Device Instance Address. The Device Instance of each unit is set by turning the small rotary switch with a small screw driver. Valid Device Instances range from “0” through to “F”.

NMEA2000® Parameter Group Numbers (PGNs)

Type	PGN No	PGN Name
Monitor	PGN127744	AC Power / Current- Phase A
	PGN127745	AC Power / Current- Phase B
	PGN127746	AC Power / Current- Phase C
	PGN127747	AC Voltage / Frequency-Phase A
	PGN127748	AC Voltage / Frequency-Phase B
	PGN127749	AC Voltage / Frequency-Phase C
Protocol	PGN126464	Tx/Rx PGN List
	PGN126996	Product Information
	PGN126998	Configuration Information
	PGN059392	ISO Acknowledge
	PGN059904	ISO Request
	PGN060928	ISO Address Claim
	PGN126208	Command/Request Group

Note: The “line to line” voltage values on PGNs PGN127747, PGN127748 and PGN127749 are calculated from “line to neutral” voltage (not available on single phase, VLL = VLN • 2 for 2-phase and VLL = VLN • for 3-phase setup).

Note: The frequency values on PGNs PGN127747, PGN127748 and PGN127749 are the same as the system frequency. They are not measured on each phase separately.

Note: The power values on PGNs PGN127744, PGN127745 and PGN127746 are calculated from the measured voltage and current values (P = U • I).

Design Standards

Parameter	Comment
NMEA2000®	Level B
Maritime Nav and RadioComm Equipment	IEC60945
CE and FCC	Electromagnetic Compatibility

Electrical and Mechanical

Parameter	Value	Comment
Operating Voltage	9 to 28 Volts	DC Voltage
Power Consumption	50mA	Average Operating
Load Equivalence Number	1	LEN
Reverse Battery Protection	Yes	Indefinately
Load Dump Protection	Yes	SAE J1113
Size	mm	96 x 84 x 35
Weight	gr	120

Environmental

Parameter	Value
IEC 60954 Classification	Protected
Degree of Protection	IP40
Operating Temperature	-25˚C to 50˚C
Storage Temperature	-40˚C to 70˚C
Relative Humidity	93%RH @40˚ per IEC60945-8.2
Vibration	2-13.2Hz @ ±1mm, 13.2-100Hz @ 7m/s2 per IEC 60945-8.7
Electromagnetic Emission	Conducted and Radiated Emission per IEC 60945-9
Electromagnetic Immunity	Conducted, Radiated, Supply, and ESD per IEC 60945-10
Safety Precautions	Dangerous Voltage, Electromagnetic Radio Frequency per IEC 60945-12

4 WARRANTY

Offshore Systems warrants this product to be free from defects in materials and workmanship for one year from the date of original purchase. If within the applicable period any such products shall be proved to Offshore Systems satisfaction to fail to meet the above limited warranty, such products shall be repaired or replaced at Offshore Systems option. Purchaser's exclusive remedy and Offshore Systems sole obligation hereunder, provided product is returned pursuant to the return requirements below, shall be limited to the repair or replacement, at Offshore Systems option, of any product not meeting the above limited warranty and which is returned to Offshore Systems; or if Offshore Systems is unable to deliver a replacement that is free from defects in materials or workmanship, Purchaser's payment for such product will be refunded. Offshore Systems assumes no liability whatsoever for expenses of removing any defective product or part, or for installing the repaired product or part or a replacement therefore or for any loss or damage to equipment in connection with which Offshore Systems products or parts shall be used. The foregoing warranties shall not apply with respect to products subjected to negligence, misuse, misapplication, accident, damages by circumstances beyond Offshore Systems control, to improper installation, operation, maintenance, or storage, or to other than normal use or service.

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Statements made by any person, including representatives of Offshore Systems, which are inconsistent or in conflict with the terms of this Limited Warranty, shall not be binding upon Offshore Systems unless reduced to writing and approved by an officer of Offshore Systems.

IN NO CASE WILL OFFSHORE SYSTEMS BE LIABLE FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES, DAMAGES FOR LOSS OF USE, LOSS OF ANTICIPATED PROFITS OR SAVINGS, OR ANY OTHER LOSS INCURRED BECAUSE OF INTERRUPTION OF SERVICE. IN NO EVENT SHALL OFFSHORE SYSTEMS AGGREGATE LIABILITY EXCEED THE PURCHASE PRICE OF THE PRODUCT(S) INVOLVED. OFFSHORE SYSTEMS SHALL NOT BE SUBJECT TO ANY OTHER OBLIGATIONS OR LIABILITIES, WHETHER ARISING OUT OF BREACH OF CONTRACT OR WARRANTY, TORT (INCLUDING NEGLIGENCE), OR OTHER THEORIES OF LAW WITH RESPECT TO PRODUCTS SOLD OR SERVICES RENDERED BY OFFSHORE SYSTEMS, OR ANY UNDERTAKINGS, ACTS OR OMISSIONS RELATING THERETO.

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WARRANTY RETURN PROCEDURE

To apply for warranty claims, contact Offshore Systems or one of its dealers to describe the problem and determine the appropriate course of action. If a return is necessary, place the product in its original packaging together with proof of purchase and send to an Authorized Offshore Systems Service Location. You are responsible for all shipping and insurance charges. Offshore Systems will return the replaced or repaired product with all shipping and handling prepaid except for requests requiring expedited shipping (i.e. overnight shipments). Failure to follow this warranty return procedure could result in the product's warranty becoming null and void.

Offshore Systems reserves the right to modify or replace, at its sole discretion, without prior notification, the warranty listed above.

5 TECHNICAL SUPPORT

If you require technical support for any Offshore Systems products you can reach us using any of the following ways:

- Tel: +44(0)1425 610022
- Fax: +44(0)1425 614794
- Email: support@osukl.com
- Web: www.osukl.com
- Post: Offshore Systems UK Ltd
  Unit 10-11 Milton Business Centre
  Wick Drive, New Milton, Hampshire BH25 6RH

Offshore Systems (UK) Ltd
Unit 10 -11 Milton Business Centre, Wick Drive,
New Milton, Hampshire, BH25 6RH, United Kingdom

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Email: mail@osukl.com Web: www.osukl.com

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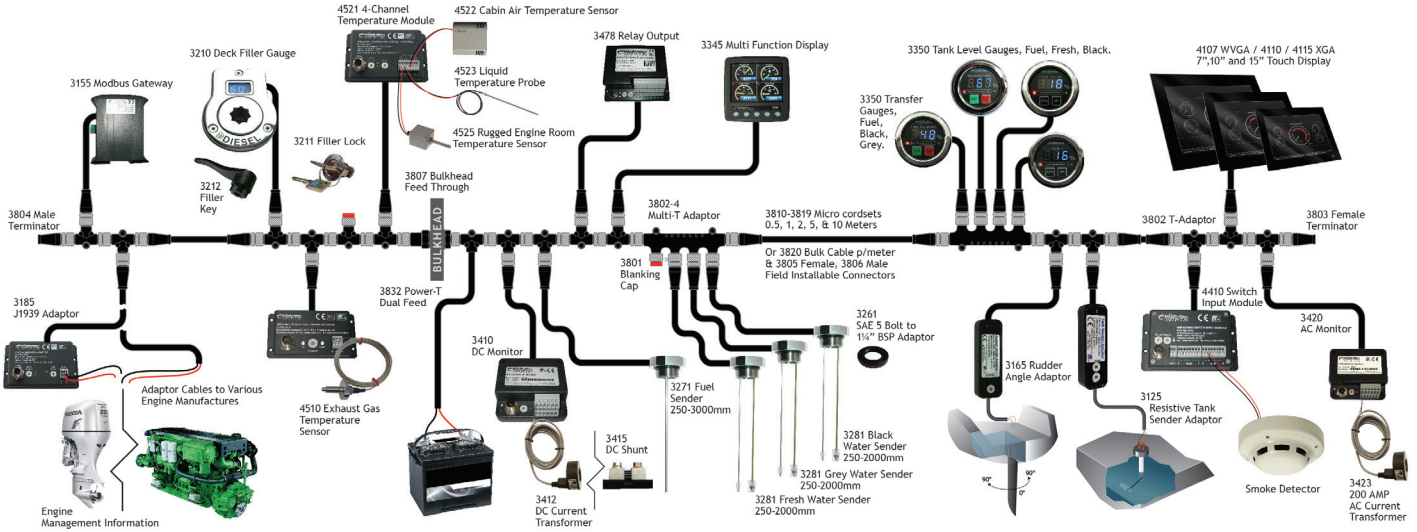
NMEA2000® VESSEL MONITORING AND CONTROL SYSTEMS


4521 4-Channel Temperature Module
4522 Cabin Air Temperature Sensor
3478 Relay Output
3345 Multi Function Display
3350 Tank Level Gauges, Fuel, Fresh, Black.
4107 WVGA / 4110 / 4115 XGA 7",10" and 15" Touch Display
3210 Deck Filler Gauge
3155 Modbus Gateway
4523 Liquid Temperature Probe
3350 Transfer Gauges, Fuel, Black, Grey.
3211 Filler Lock
4525 Rugged Engine Room Temperature Sensor
3212 Filler Key
3807 Bulkhead Feed Through
BULKHEAD
3804 Male Terminator
3802-4 Multi-T Adaptor
3810-3819 Micro cordsets 0.5, 1, 2, 5, & 10 Meters
3802 T-Adaptor
3803 Female Terminator
Or 3820 Bulk Cable p/meter & 3805 Female, 3806 Male Field Installable Connectors
3801 Blanking Cap
3185 J1939 Adaptor
3832 Power-T Dual Feed
3261 SAE 5 Bolt to 1¼" BSP Adaptor
4410 Switch Input Module
3420 AC Monitor
3165 Rudder Angle Adaptor
3125 Resistive Tank Sender Adaptor
3410 DC Monitor
3271 Fuel Sender 250-3000mm
3281 Black Water Sender 250-2000mm
3281 Grey Water Sender 250-2000mm
3281 Fresh Water Sender 250-2000mm
Adaptor Cables to Various Engine Manufactures
4510 Exhaust Gas Temperature Sensor
3415 DC Shunt
3412 DC Current Transformer
Engine Management Information
Smoke Detector
3423 200 AMP AC Current Transformer

Up to 16 each type of Sender can be installed on a single network